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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/601,378	06/23/2003	David Farrow	SMB-004	7906

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EXAMINER	
SKOWRONEK, KARLHEINZ R	
ART UNIT	**PAPER NUMBER**
1631	

DATE MAILED: 11/29/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	10/601,378	FARROW, DAVID	
	Examiner	Art Unit	
	Karlheinz R. Skowronek	1631	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *25 October 2006*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-5,7,8 and 22-25* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-5,7,8 and 22-25* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date *10/25/2006*.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

Information Disclosure Statement

The information disclosure statement (IDS) submitted on 25 October 2006 was filed after the mailing date of the First Action On the Merits on 3 May 2006. Applicant has clarified and corrected the error regarding citation A22 on form PTO-1449 originally filed 7 November 2005. The examiner has entered the correction on form PTO-1449 filed 25 October 2006. Only citation A22 was considered; all other citations were lined through as they had been considered previously. Accordingly, the examiner has considered the information disclosure statement.

Claim Status

Claims 6 and 9-21 have been cancelled.

Claims 22-25 are newly introduced.

Claims1-5, 7-8, and 22-25 are pending.

Claims1-5, 7-8, and 22-25 are being examined.

Response to Arguments

Applicant's arguments, see Remarks, filed 25 October 2006, with respect to the 35 USC 112, 1st paragraph rejection against claim 7-8 have been fully considered and are persuasive. The rejections of claim 7-8 have been withdrawn.

Claim Rejections - 35 USC § 112, 2nd Paragraph

The following is a quotation of the second paragraph of 35 U.S.C. 112:

> The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

Claims 7 and 8 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Claim 7 is indefinite as it depends from cancelled claim 6. Claim 8 is also rejected because of its dependence from claim 7, and thus contains the same issue.

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

The text of those sections of Title 35, U.S. Code not included in this action can be found in a prior Office action.

Claims 1-5, and 22 are rejected under 35 U.S.C. 102(e) as being anticipated by Ambrus et al (USPN 6,528,057).

The claims are drawn to a method of detecting the presence of an analyte particle, the particle being a virus, specifically Human Immunodeficiency Virus (HIV), in

a biological fluid, specifically blood. The method comprises the steps of filtering particulates that are larger than the virus, reacting the virus with a reagent to produce a complex that is larger than the virus alone, filtering the virus-reagent complex to remove particles that are smaller, and testing for the presence of the virus.

Ambrus et al teach a method of filtering HIV particles from the biological fluid blood using a filter (col. 5, lines 1-2). Particles larger than the viral particle excluded from filter (col. 5, lines 6-10). The virus may pass through the filter. This separates the blood cells from the plasma containing the viral particle. The plasma is then contacted with a reagent to form virus reagent complex (col. 5, lines 23-26). Within each hollow fiber is a reagent that is capable of form a complex with the viral particle preventing elution from the hollow. Particles that are smaller than the virus-reagent complex are not retained (col. 5, lines 34-40). Ambrus et al teach the testing the sample for the presence of virus-reagent complexes (col. 6, lines 6-10).

Claims 1-5 and 22 are rejected under 35 U.S.C. 102(b) as being anticipated by Tullis et al (American Clinical Laboratory, p.22-23, October/November 2001).

The claims are drawn to a method of detecting the presence of an analyte particle, the particle being a virus, specifically Human Immunodeficiency Virus (HIV), in a biological fluid, specifically blood. The method comprises the steps of filtering particulates that are larger than the virus, reacting the virus with a reagent to produce a complex that is larger than the virus alone, filtering the virus-reagent complex to remove particles that are smaller, and testing for the presence of the virus.

Tullis et al teach a method of filterin HIV from blood using a filter that sperates the cells (particles larger than the virus) from the HIV(p. 22, col. 1, para. 3, lines 7-10 to col. 2, line 1). Virus is passed through the filter were it complexes with a ligand reagent (antibodies)reactive to gp120 (p. 22, col. 2, lines 8-11) allow further passage of particles smaller than the viral-reagent complex particles. Tullis et al teach the detection of Viral-reagent complexes (col.1, para. 3, lines 10-14).

Claim Rejections - 35 USC § 103

The text of those sections of Title 35, U.S. Code not included in this action can be found in a prior Office action.

This rejection is reiterated from the previous Office action.

1. Claims 1-5, 7, and 22-25 are rejected under 35 U.S.C. 103(a) as being unpatentable over King et al (US PGPUB 20010008760), in view of Coller et al.

Claims 1-5, 7 and 22-25 are directed to detecting a particle isolated from a fluid (claim 1 limitation), a biological fluid (claim 2 and 24 limitation) or blood (claim 3 and 25 limitation) where the particle may be a virus (claim 5 and 22 limitation) or protein. That particle is separated from larger particles by filtration (claim 1 and 22), complexed with a reagent (claim 1 and 22), the reagent particle complex separated by filtration from particles that are smaller (claim 1 and 22) and finally the fluid tested for the presence of the reagent-particle complex (claim 1 and 22).

King et al describe the use of CD4 "coupled to a surface and then used to capture cells expressing the HIV antigen gp120 (pg 6, [0054])"(claim 7 and 23 limitation). One of ordinary skill in the art will recognize that the method of King et al. will

also result in the capture of viral particles expressing the antigen. Thus the method of King et al is capable of separating viral particles from other particles in a fluid. King et al. also describe the use of CD4 in detecting HIV by conjugating CD4 to a fluorescent moiety, FITC, and using flow cytometry to detect the FITC [0057].

King et al does not teach the isolation of particles larger than the analyte particles.

Pre-purfication of analyte samples is well known in the art. In particular, the separation of samples containing HIV virus particles is also well known. For example, Coller et al teach the pre-purification from larger particles filtration by centrifugation, whereas Tullis et al and Ambrus et al teach the pre-purification of larger particles by filtration through filter of pore size to exclude particles larger than the analyte particle.

It would have been obvious to one of ordinary skill in the art to combine the CD4 couple to a surface of King et al with the method of Coller et al used to purify the Australia antigen, now know to be the hepatitis C virus, because the method of Coller et al would result in a reduced contamination of the viral particles of interest by proteins and cells of the blood.

In Coller et al., the Australia antigen, which may be a virus (col1, lines 27-29 and 37-39) is isolated from human blood plasma (col 3, lines 61-65; col 4, lines 1-30) by passing fluid containing the Australia antigen over a gel filtration column (col 4, lines 40-46). While this step removes particles that are smaller than the Australia antigen, Coller et al also teach the separation of particles that are larger than the Australia antigen through the use of cesium chloride gradient centrifugation. The cesium chloride gradient

will result the separation of the Australia antigen from particles that are larger from the Australia antigen (col. 5, lines 54-55). The antigen is then conjugated (complexed) to a compound containing an Iodine radioisotope (col 6, lines 5-15) and then filtered to remove particle that are smaller than the Australia antigen-isotope complex (col 6, lines 42-69). Finally, the isotope-antigen complex is tested to determine the presence of the antigen in the fluid (col 7, lines 1-8).

Coller et al describe the separation of particle larger than the Australia antigen and particles smaller than the Australia antigen from the Australia antigen. Coller et al. also describe the labeling of the Australia antigen to aid in its detection (see above). Coller et al motivates one to use the in " detecting the presence of such an antigen or its antibody if it should happen to be present in other biological fluids and not merely human sera as for example, the body fluids of lower animals tissue culture fluids water supplies, etc. (col. 16, lines64-68)".

One would have had a reasonable expectation of success to result in the instantly claimed invention.

Claim 8 is rejected under 35 U.S.C. 103(a) as being unpatentable over King et al (US PGPUB 20010008760), in view Coller et al of as applied to claim 1-5 and 7 above, and further in view of Peterson et al (US PG PUB 2002/0042125).

Claim 8 is directed to filtering using a microinjected molded plastic.

Peterson et al teach the filtering of virus particles using a microinjected molded plastic ([0011] and p. 9, claim 1).

It would have been obvious to one of ordinary skill to combine the method of Peterson et al to methods of Coller et al, King et al and Motomura et al. because Peterson et al teach that the method employs cartridges are designed to automatically mix reagents with a fluid sample and filter samples ([0043]).

One would have been motivated to do so by Peterson et al. because the method of Peterson et al provides a superior blend of efficiency and convenience ([0010]).

One would have had a reasonable expectation of success because the method of Peterson et al describes an improvement on existing methodology.

Claims 1-5, 7, 8, and 22-25 rejected under 35 U.S.C. 103(a) as being unpatentable over Hanna et al (IEEE Nanobioscience, Vol. 2, No.1, p. 6-13, March 2003), in view of Bernhardt et al (USPN 6.391,657).

The claims are drawn to a method of detecting the presence of an analyte particle, the particle being a virus, specifically Human Immunodeficiency Virus (HIV), in a biological fluid, specifically blood. The method comprises the steps of filtering particulates that are larger than the virus, reacting the virus with a reagent to produce a complex that is larger than the virus alone, filtering the virus-reagent complex to remove particles that are smaller, and testing for the presence of the virus. The filtering is performed with microinjected plastic.

Hanna et al teach a method of detecting HIV using a "system-on-a-chip" filter composed of hollow fiber filter system (p. 6, col. 2, lines 1-5; para. 2, lines 1-4; and p.7, col. 1, para 3). The particles larger than the virus flow around the fibers, whereas the

virus flows through the fibers (p. 7, col. 2, para 3, lines 6-9). Hanna et al teach the existence of a reagent within the hollow fibers, capable of forming a complex with the virus specifically with gp120 (p. 7, col. 2, para. 3, lines 14-16). The formation of the complex prevents the flow of virus from the filter. Hanna et al teach detection of the virus by determining the change in capacitance in a surface coated with the reagent (p. 8, col. 1, "Sect D dectecting the binding").

Although Hanna et al teach the use of antibodies because of their specificity and affinity for their ligands, it would have been obvious to one of ordinary skill to use CD4 as the reagent in the place of antibodies because of the similar affinity and specificity of CD4 for the gp120 HIV protein. Thus it would have been obvious to one of ordinary skill in the art to combine the method of Hanna et al with the method of virus removal by ultrafiltration of Bernhardt et al.

Bernhardt et al teach the formation of virus-ligand complexes composed of CD4 receptor-HIV (table 1) to result in an increased particle size (col. 2, lines 10-18) thereby allowing particle smaller than the virus-reagent complex to flow through the filter.

One would have been motivated to do so by Bernhardt et al who teach that among the benefits of forming complexes between viral particles and ligand reagents is that the separation effect is improved (abstract, line 6) and the safety of plasma proteins is increased (col. 1, line 34).

One would have a reasonable expectation of success because Hanna et al teach that larger hemodialysis filters that operate on similar principles are available (p.7, para. 3, lines 2-16).

Conclusion

No claim is allowable.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Karlheinz R. Skowronek whose telephone number is (571) 272-9047. The examiner can normally be reached on Mon-Fri 8:00am-5:00pm (EST).

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Andrew Wang can be reached on (571) 272-0811. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Karlheinz R. Skowronek/
KRS

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PRIMARY EXAMINER